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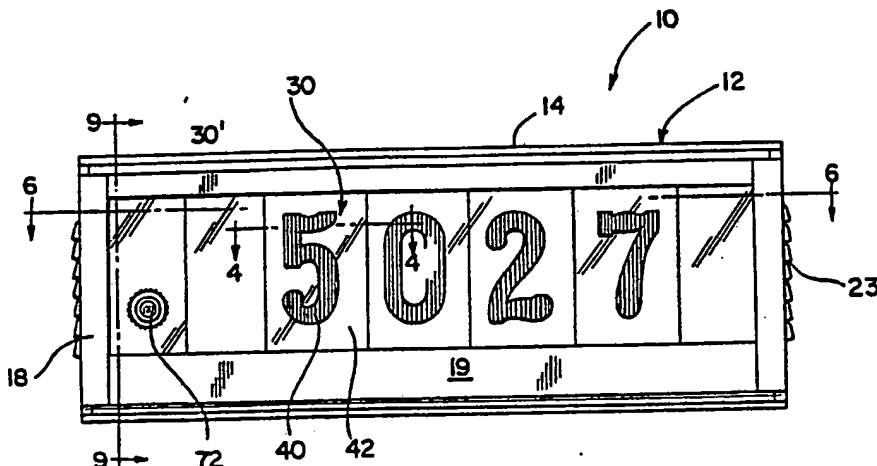
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US89/05551 (22) International Filing Date: 18 December 1989 (18.12.89) (30) Priority data: 285,255 16 December 1988 (16.12.88) US (71)(72) Applicant and Inventor: CONTI, William, L. [US/US]; Post Office Box 3821, Pensacola, FL 32506 (US). (74) Agents: SCHERER, Jonathan, L. et al.; Fleit, Jacobson, Cohn, Price, Holman & Stern, The Jenifer Building, 400 Seventh Street, N.W., Washington, DC 20004 (US).		(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), LU (European patent), NL (European patent), SE (European patent). Published <i>With international search report.</i>

(54) Title: INFORMATION DISPLAY DEVICE



(57) Abstract

A rectangular housing (12) having an open front face bordered by track grooves which receive self-diffusing laterally interlocked panels (30). A source of illumination (50) is controlled by a photoelectric cell (72) exposed to ambient light through one of the panels (30). An arcuate reflector (80) directs illumination onto the panels (30) and a light transmissive bottom wall (20) while reflective coatings on the end wall (18) prevent illumination fade out at the end panels. Also, a one-piece transparent housing (112) has a supporting lens wall (126) on which a display panel is held by a frame (120). A source of illumination (134) is controlled by a photoelectric cell (152) projecting into a bubble formation (160) on the supporting wall (114), (112), exposed to ambient light through aligned openings in the display panel (126) and the frame (120). Illumination (134) reflected from a back panel (116) illuminates the display panel (126) and is transmitted by portions of the housing projecting through window openings (122) in the frame (126).

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INFORMATION DISPLAY DEVICEBackground of the Invention

The present invention relates to illuminated information display devices embodying certain improvements to the display apparatus disclosed in my prior U.S. Patent Application Serial No. 781,639, filed September 30, 1985, now U.S. Patent No. 4,765,080.

Illuminated information display devices having a changeable panel assembly with an internal source of illumination automatically activated and deactivated by a photoelectric cell, are generally known in the art. In one type of such illuminated information display device, a light transmitting front window of a housing, bearing indicia, such as letters and numbers or other characters, is illuminated by a light source rearwardly spaced therefrom within the housing. The housing is provided with track means bordering a front opening such that separate display panels may be retained therein. According to my prior U.S. Patent No. 4,765,080, aforementioned, a photoelectric cell is mounted on one of the panels to control activation of the source of light transmitting illumination through the front panels as well as a bottom wall of the housing.

The indicia display panels are changeable as disclosed by way of example in U.S. Patent Nos. 733,800, 4,254,457 and 4,373,284 to Beugler, Lordier and Crane, respectively. According to the Lordier and Crane Patents, the front face is formed by a

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backing panel of uniform thickness on which replaceable indicia bearing display plates are mounted by groove tracks carried by the backing panel. The backing panel is made of light transmitting material or of translucent material for light diffusing purposes. According to the Lordier and Beugler patents, the display panels have lateral interlocking edge recesses. The front face disclosed in the Beugler patent is made of opaque interlocking display plates having holes formed therein through which light is transmitted to form the indicia displays.

It is an object of the present invention to provide an improved illuminated information display device embodying the advantages of the aforementioned types of information display devices in a less costly manner and capable of being more easily repaired and maintained.

Summary of the Invention

The present invention provides for an illuminated information display apparatus of the type having an elongated housing formed by top, bottom, front and end walls and an open face. Track grooves are formed in opposing edges of the top and front walls for slidably receiving a plurality of panels to interlock with the top and front walls. The panels themselves are laterally interlocked with certain of the panels having indicia-bearing light transmitting portions.

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The present invention provides for an illuminated information display device having a completely transparent one - piece housing made of a heat resistant material and including front, side and end walls. The housing is received within an external frame having side and end wall openings through which non-planar wall portions of the housing project to transmit light therefrom. A self-diffusing, indicia-bearing display panel is retained between the frame and a planar supporting surface of an internally ribbed front wall of the housing for exposure through a front window opening of the frame.

An illumination light source mounted within the housing is controlled by a photoelectric cell or ambient light sensor for selectively activating and deactivating the light source. The light from the source is emitted and reflected from an arcuate reflector or a back panel closing an illumination chamber within the housing to illuminate the display panel and transmit light from the non-planar wall portions of the transparent housing projecting from the frame openings. Bright spot illumination of the indicia is effectively avoided by optical light diffusing serrations formed on the display panel and the front wall of the housing. The reflective back panel mounts the light source and the photo-electric cell, which extends into a protective bubble-like formation on the housing front wall, projecting into aligned

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openings in the frame and the display panel so as to expose the photo-electric cell to ambient light conditions in substantially coplanar relation to the indicia bearing surface of the display panel and yet sealing the sensor within the illumination chamber to prevent its exposure to the external environment. The reflector configuration and its positional relationship to the display panels, the light source and housing walls is such that the temperature build-up within the housing is reduced to levels which will tolerate use of plastic materials for the bottom and front walls and higher heat emitting light sources such as incandescent lamp bulbs.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

For a further understanding of the nature and object of the present invention, reference should be had to the following detailed description taken in conjunction with the accompanying drawings, in which like parts are given like reference numerals.

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Figure 1 is a front view of a preferred embodiment of the apparatus of the present invention.

Figure 2 is a top view of the apparatus of Fig. 1.

Figure 3 is an enlarged transverse section view taken along a line 3-3 of Fig. 2.

Figure 4 is an enlarged partial section view taken along line 4-4 of Fig. 1.

Figure 5 is a partial perspective view of a portion of the display wall assembly of the apparatus of the present invention.

Figure 6 is a top section view taken along section line 6-6 in Fig. 1.

Figure 7 is an end view of the apparatus shown in Figs. 1 and 2.

Figure 8 is an enlarged section view taken along section line 8-8 in Fig. 7.

Figure 9 is an enlarged partial section taken along line 9-9 in Fig. 1.

Figure 10 is a front view of a preferred embodiment of the apparatus of the present invention.

Figure 11 is an enlarged partial section view taken substantially through a plane indicated by section line 11-11 in Figure 10.

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Figure 12 is an enlarged transverse section view taken through a plane indicated by section line 12-12 in Figure 10.

Figure 13 is a partial section view taken substantially along a section line 13-13 in Figure 10.

Figure 14 is a rear elevation view of the apparatus shown in Figure 10.

Figure 15 is an enlarged partial section view taken substantially through a plane indicated by section line 15-15 in Figure 11.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figures 1, 2 and 3 illustrate a preferred embodiment of the present invention designated generally by the reference numeral 10. Apparatus 10 comprises an elongated rectangular housing 12 having a top wall 14 and back wall 16 preferably made of aluminum. A separate piece of extruded, transparent plastic material forms a bottom wall 20 and a partial front wall portion 19 at right angles thereto. The housing 12 is thus formed with an open rectangular face framed by the front edges of top wall 14 and the front wall portion 19. The longitudinal ends of the housing are closed by removable end wall covers 18 provided with a plurality of vertically spaced, louvered vents 23 as shown in Figs. 7 and 8. A bug screen 25 having vertically spaced, horizontal slots 26

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therein is made of a sheet of injection molded plastic placed on the inside surface of the cover wall as illustrated in Fig. 8. The inside surface of the screen 25 has a white coating so that it may serve as a reflector and prevent illumination fade out at the ends of the front face of the housing. Cover walls 18 are removably affixed to housing 12 at the end edges of top, back and bottom walls 14, 16 and 20 by threaded screws 78 received within elongated formations 27 and 29 on the inside surfaces of top wall 14 and bottom wall 20 as shown in Figs. 3 and 9.

As more clearly seen in Fig. 3, top wall 14 and front wall portion 19 of the housing are provided with opposing grooves or tracks respectively formed by parallel spaced upper legs 32 and 34 and lower legs 36 and 38 which extend the length thereof. Such grooves afford guidance and support for a plurality of panels including indicia bearing plate members or display panels 30 preferably made of transparent Plexiglass. In the preferred embodiment, the Plexiglass plate members 30 have opaque indicia coatings 40 forming numbers, figures or designs and translucent background coatings 42. Plate members 30 are sized to be slidably received in the opposing track grooves of the top and front walls 14 and 19, respectively, through which the walls are interlocked by projection 44 on the legs 34 and 38 slidably received in notches 46 in the panels 30.

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As shown in Figs. 4 and 5, recesses 48 are provided on each plate member 30 for laterally interlocking abutting plate members 30. Thus, individual plate members are slidably received in the wall grooves from an opened longitudinal end of the housing upon removal of a cover wall 18 and bug screen 25. The inserted panels 30 are thereby moved into laterally interlocking relationship to each other as shown in Fig. 6 to exclusively form a rigid front wall assembly and interlock the top and front wall portions of the housing, without any backing panel.

Apparatus 10 is also provided with a source of illumination 50 mounted therein. As best seen in Fig. 6, the illumination source 50 is mounted interiorally of the housing 12 and includes a conventional socket 56 adapted to accept a conventional lamp bulb 58 such as a 130-volt, 40 watt incandescent bulb powered through socket 56 which may be wired to a conventional house electrical power source of 110 volts, for example. To direct illumination generated in bulb 58 when light source 50 is activated, a cross-sectionally arcuate reflector 80, shown in Figs. 3 and 6, is provided in housing 12 between lamp bulb 58 and back wall 16 in partially enclosing relation to lamp bulb 58. Formation of the housing walls with internal reflective surfaces, heretofore believed to be mandatory, is therefore unnecessary. Reflector 80 is slidably inserted by means of a support 82 into a channel

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formation 84 formed on the inside of top wall 14 of housing 12 and is thereby positioned to reflect and direct illumination onto the display panels or plates 30 and the bottom wall 20. To prevent overheating within the illumination chamber formed in the housing 12, the end cover walls 18 are provided with the louvered air vents 23 protected by the end reflective bug screen 25 as hereinbefore described. The bottom wall 20 is light transmissive so that light reflected by reflector 80 and emitted from the light source 50 will emerge from the bottom of the housing.

Apparatus 10 is also provided with means 70 for selectively activating and deactivating light source 50 at predetermined states of ambient light. In the preferred embodiment, the means 70 includes a photoelectric cell 72 which is mounted in an aperture provided in an end panel 30' of the front wall assembly so that the photoelectric cell is continuously exposed to ambient light conditions. Photoelectric cell 72 would be connected in the conventional electrical manner to light source 50 via socket 56 and preset to activate light source 50 when the ambient light reaches a certain minimum brightness and to deactivate light source 50 when the ambient light condition reaches a certain maximum brightness. In this way, apparatus 10 is automatically illuminated at dusk and the illumination terminated at sunrise when the indicia displayed on panels 30 may be read

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without the assistance of internal illumination.

As aforementioned, apparatus 10 has a two-way light transmissive bottom wall 20 so that external light may pass into the illumination chamber to provide an additional source of illumination. With apparatus 10 installed on the front porch of a home and light source 50 activated, not only would indicia on plates 50 be visible to a viewer but an additional source of light provided through bottom wall 20 would provide the viewer with an additional margin of safety for climbing up the porch and the like.

As shown in Figs. 3, 4 and 5, each of the panels 30 is made of a transparent material, with an external planar surface on which the indicia coatings 40 and 42 are placed. The opposite internal surface of each panel is integrally formed with optical means for diffusing light. According to the embodiment shown, the optical means consists of angularly related surface portions converging from the external planar surfaces of the display panels 30 toward the light source 50. The diffusing surface portions of the panels are provided with ribbing or pyramidal projections 60 for uniform light reflection purposes. Thus, each panel 30 is self-diffusing because of the ribbed converging surface portions thereon which optically acts to diffuse light from lamp bulb 58 and thereby prevent development of any bright spots during internal illumination of the indicia being displayed on the panel 30.

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Figures 10, 11 and 12 illustrate a preferred embodiment of the present invention designated generally by reference numeral 110. Apparatus 110 comprises an elongated, one-piece housing 112 made of a heat-resistant material such as a solid polycarbonate plastic that is transparent or light transmissive throughout. The housing is provided with a front supporting wall portion 114 and encloses an illumination chamber closed by a reflective, opaque back panel 116. A separate frame generally referred to by reference numeral 120, made of a preferably white translucent plastic material, is fitted externally onto the housing. The frame 120 has a front window opening 122 exposing an indicia bearing surface 124 of a rectangular display lens panel 126 made of a transparent or light transmissive material. The display panel 126 is retained between the frame 120 and the planar supporting surface 127 of wall portion 114 of the housing, and is formed with light diffusing ribs or serrations 128 projecting rearwardly therefrom in perpendicular or off-set relation to and spaced from light diffusing ribs 129 projecting from wall portion 114 into the illumination chamber as shown in Figures 12 and 13. Non-planar wall portions 130 and 132 of the housing 112 project through side and end wall window openings in the frame 120 in angular surrounding relation to the display panel 126 to transmit light from a source of illumination 134 which is mounted within the

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illumination chamber by the back panel 116. Threaded screws 136 secure the back panel 116 to the housing 112 as more clearly seen in Figures 11 and 15. The screws 136 thus extend through holes in formations 138 projecting from the housing into arcuate receptacles formed on a peripheral retainer portion 142 of the back panel 116.

As more clearly seen in Figures 11 and 12, the source of illumination 134 is mounted within the illumination chamber of housing 112 by means of a bracket 144 secured to the back panel 116. The source of illumination 134 includes a conventional socket 156 carried by the bracket 44 adapted to accept a conventional lamp bulb 158. The socket 156 is connected to an electrical power source by means of a transformer 145 also mounted on back panel 116 and wiring 146 extending through an opening 148 in the back panel. The opening 148 is surrounded by arcuate vents 150 which prevent overheating within the illumination chamber of the housing 112 closed by the back panel.

The electrical wiring 146 is also connected to a conventional photo-electric cell type of light sensing device 152 for selectively activating and deactivating the light source 134 at predetermined states of ambient light. The sensing device 152 is mounted on the back panel 116 by a bracket 154 having a tubular formation 157 through which the wiring 146 extends to the sensing device. Thus, the light source 134 is activated when ambient light

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reaches a certain minimum brightness and deactivated when the ambient light condition reaches a certain maximum brightness in a manner generally well known in the art. In this way, apparatus 110 is automatically illuminated at dusk and the illumination terminated at sunrise when the indicia 159 displayed on surface 124 of the display panel 126 may be read without the assistance of internal illumination.

With apparatus 110 installed, and light source 134 activated, not only would indicia 159 on panel 126 be visible to a viewer but additional illumination is transmitted through wall portions 130 and 134 of the housing projecting through window openings in the frame 120. The transparent housing 112 is furthermore provided with protective means in the form of a raised bubble portion 160 located adjacent one longitudinal end of the front wall portion 114 to receive and protectively enclose the sensing device 152 and thereby seal the illumination chamber from the external environment as more clearly seen in Figure 13. An enlarged longitudinal end portion 164 of the frame 120 firmly holds the display panel 126 with an opening therein in alignment with the opening 162 in the frame to receive the protective bubble portion 160 and expose the terminal end 166 of the sensing device to ambient light conditions substantially in coplanar relation to the indicia bearing surface 124 of the display panel.

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As aforementioned, the display panel 126 is made of a transparent material, with the indicia 159 placed on its external planar surface 124. The opposite internal side of the panel 126 is integrally formed with the light diffusing serrations or ribs 128 offset from the light diffusing ribs 129 on the supporting wall portion of the housing for maximum optical diffusion of light from lamp bulb 158 and thereby more effectively prevent development of bright spots during internal illumination of the indicia bearing panel.

It will be apparent from the foregoing description that the apparatus 110 may be readily assembled as a unit by snap fit between the housing 112, the frame 120 and the display lens panel 126. Such components of the unit may be decoratively varied individually and/or in combination with respect to selection of colors, materials and structural design within the scope of this invention. In view of the heat resistant property of housing 112 as aforementioned, greater flexibility in the selection of material grade for decorative purposes by way of example may be allowed for frame 120 because of its snap fit assembly onto the external surfaces of the housing.

The foregoing is considered as illustrative only of the principles of the invention. Further since numerous modifications

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and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and, accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

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I CLAIM:

1. An illuminated information display comprising a housing having an elongated top wall, an elongated bottom wall and end walls connected to opposite longitudinal ends of the top and bottom walls to form at least one open face, track formations on said walls bordering the open face, a plurality of laterally interlocked plate members received in said track formations between the end walls, some of said plate members having indicia display portions thereon, a light source within the housing, optical means mounted on the plate members within the housing for diffusing illumination from the source and light responsive means mounted in one of the plate members abutting one of said end walls for activating and deactivating said light source, said bottom wall being light transmissive, and internal reflecting means mounted on the end walls and in partially enclosing relation to the light source for restrictively directing illumination onto the plate members and the bottom wall.

2. The display as defined in claim 1, wherein said optical means comprises a pair of ribbed surface portions extending in converging relation from the indicia display portion of the plate member toward the light source.

3. An illuminated information display comprising a rectangular housing having an elongated top wall, an elongated

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bottom wall and end walls connected to opposite longitudinal ends of the top and bottom walls to form an open face, track formations on the walls bordering the open face, a plurality of laterally interlocked plate members received in said track formations between the end walls, said plate members having indicia display portions thereon, a light source within the housing, light reflecting means within the housing directing light from the source for illumination of the indicia display portions of the plate members and optical means integral with each of the plate members for diffusing the illumination from the light source transmitted to the indicia display portions including a pair of ribbed surface portions extending in converging relation from the indicia display portion of the plate member toward the light source.

4. An illuminated information display comprising a housing having an open face, a self-diffusing panel assembly closing said open face and having opaque and light-transmitting portions thereon forming indicia, a source of illumination mounted within the housing, track means formed in the housing for receiving the panel assembly therein in closing relation to the open face of the housing, internally reflective wall means removably mounted on the housing for providing internal access to the housing and preventing illumination fadeout on the panel assembly adjacent thereto and means mounted in the self-diffusing panel between the

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internally reflective wall means and the indicia for controlling the source of the light in response to changes in ambient light conditions.

5. An illuminated information display comprising a housing having at least two walls framing an open face, a continuous panel assembly closing said open face and having opaque and light transmitting portions thereon forming indicia, a source of illumination mounted within the housing, track means formed in the housing for receiving the panel assembly therein in closing relation to the open face of the housing, removable wall means mounted on the housing and providing access to the track means for selectively changing the panel assembly, optical means integrally formed on the panel assembly for diffusing illumination from the source of illumination to the light transmitting portions and internally reflective surface means mounted on the removable wall means for preventing illumination fade at opposite ends of the panel assembly.

6. An illuminated information display comprising a housing having an open face, a continuous panel assembly closing said open face and having opaque and light transmitting portions forming indicia thereon, a source of illumination mounted within the housing, a pair of spaced tracks formed in the housing and receiving the panel assembly therein in rigidified closing relation

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to the open face of the housing and light reflecting means within the housing for directing the illumination toward the open face, said housing having a light transmissive section on which one of the tracks is formed and including a bottom wall substantially perpendicular to the panel assembly, said light reflective means including a reflector mounted in partially enclosing relation to the source from which the illumination is restrictively directed onto the panel assembly and the light transmissive section including the bottom wall.

7. An illuminated information display comprising a light transmissive housing having a supporting wall portion and enclosing an illumination chamber, a display panel positioned on said planar wall portion of the housing externally of the illumination chamber, a light reflecting panel secured to the housing and closing the illumination chamber therein, a light source within the illumination chamber, said display panel having means for diffusing light from the source, light sensing means mounted by the reflecting panel and projecting through the display panel for activating and deactivating said light source, and frame means mounted on the housing for retaining the display panel on the supporting wall portion externally exposed to ambient light conditions.

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8. The display device as defined in claim 7 wherein said light diffusing means comprises parallel spaced ribs respectively formed on the display panel and the supporting wall portion and projecting therefrom toward the light source, the ribs on the supporting wall portion being offset from the ribs on the display panel to maximize light diffusion.

9. The display device as defined in claim 7 wherein said housing includes side and end wall portions projecting through window openings in the frame means and protective means projecting from said supporting wall portion of the housing in enclosing relation to the light sensing means for exposure thereof to the ambient light conditions externally at said supporting wall portion of the housing while sealing the light sensing means therein.

10. In an illuminated display device having an indicia bearing panel, a source of illumination and ambient light sensing means for controlling energization of said source to illuminate the indicia bearing panel, the improvement comprising a one-piece heat resistant housing having a light transmissive supporting wall on which the indicia bearing panel is operatively positioned and light transmissive non-planar portions interconnected with the supporting wall to enclose an illumination chamber, frame means supported on the housing for retaining the indicia bearing panel operatively positioned on the supporting wall, said frame means having window

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openings through which said non-planar portions of the housing project and reflective means secured to the housing for directing illumination from the source to the indicia bearing panel and the non-planar portions of the housing projecting from the window openings in the frame means.

11. The improvement as defined in claim 10 including protective means integrally formed on the supporting wall in enclosing relation to the light sensing means for sealing the illumination chamber, said frame means and the indicia bearing panel having aligned openings through which said protective means extends to expose the light sensing means to external ambient light conditions in substantially coplanar relation to the indicia bearing panel.

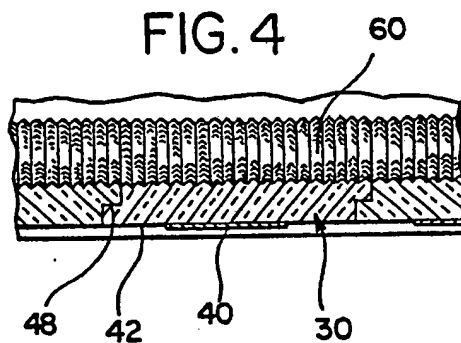
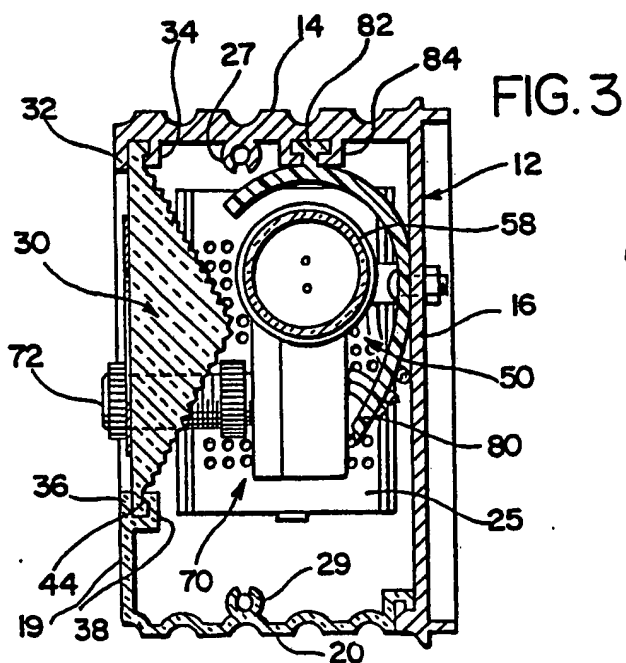
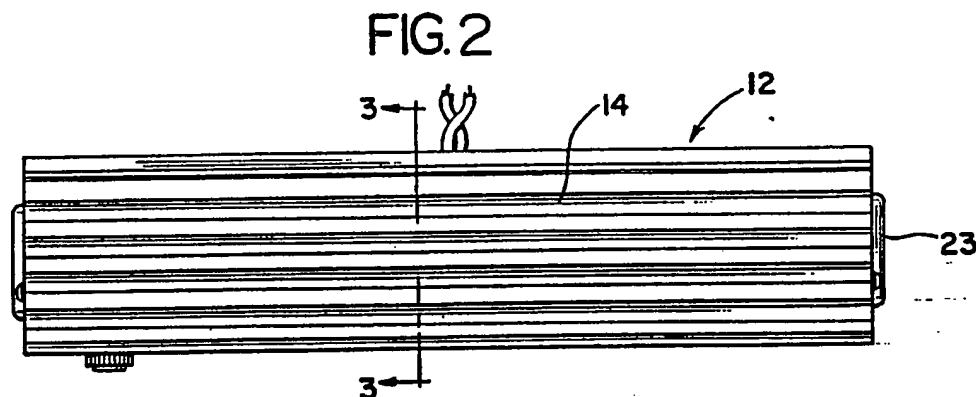
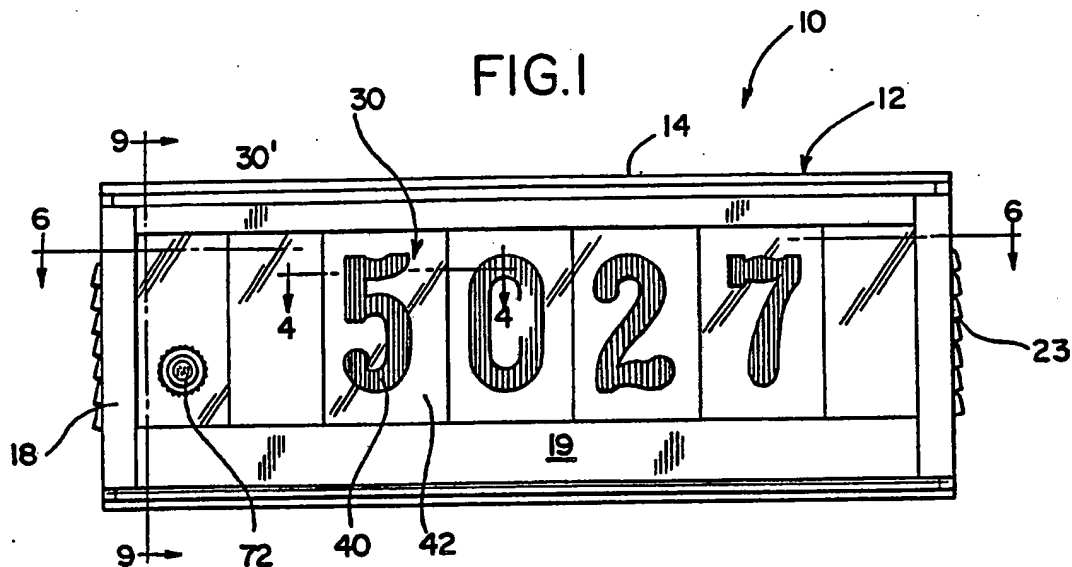
12. In an illuminated display device having an indicia bearing panel, a source of illumination and ambient light sensing means for controlling energization of said source to illuminate the indicia bearing panel, the improvement comprising a light transmissive housing having a supporting wall on which the indicia bearing panel is operatively positioned, frame means supported on the housing for retaining the indicia bearing panel operatively positioned on the supporting wall and protective means formed on the supporting wall of the housing and projecting therefrom in enclosing relation to the light sensing means for exposure to

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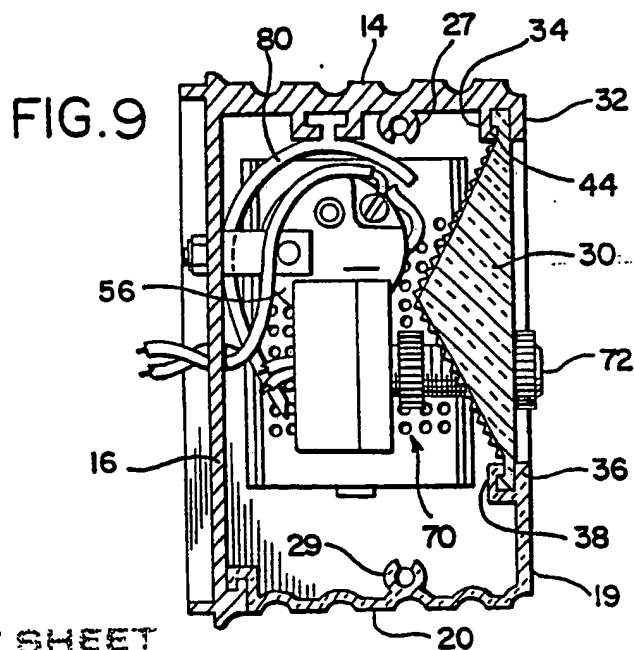
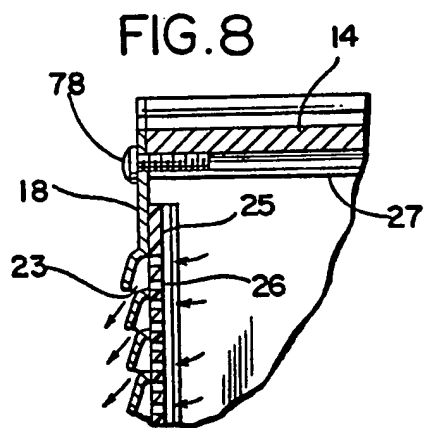
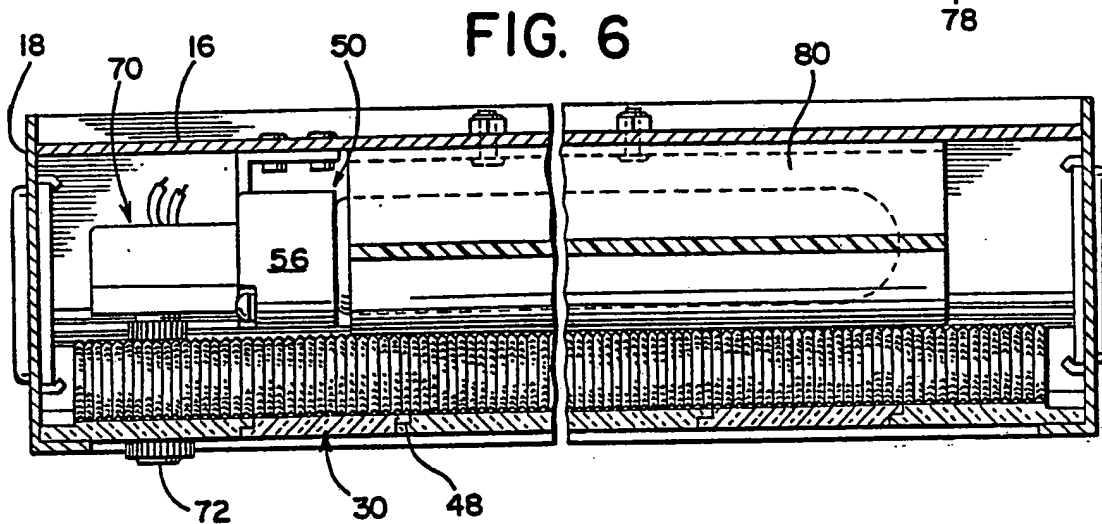
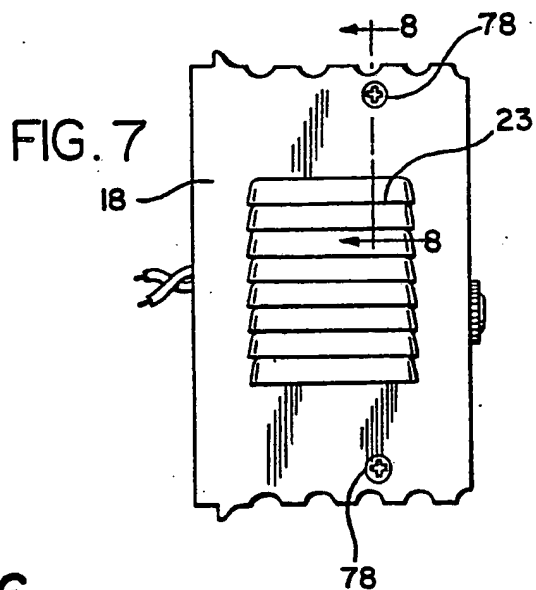
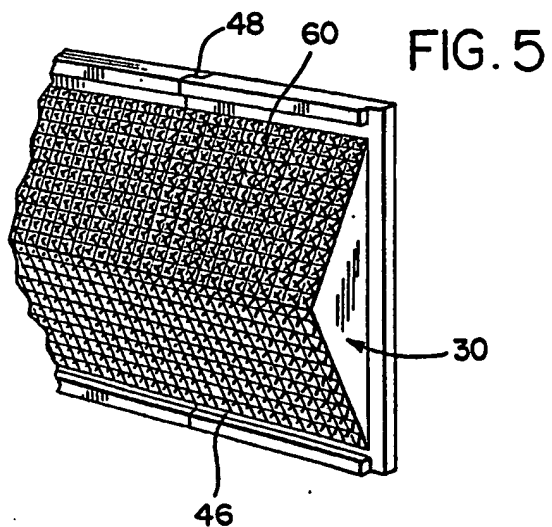
ambient light conditions in substantially coplanar relation to the indicia bearing panel.

13. The improvement as defined in claim 12 wherein said frame means and the indicia bearing panel have aligned openings through which the protective means projects to expose the light sensing means to the ambient light conditions while sealing the housing from the external environment.

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FIG. 10

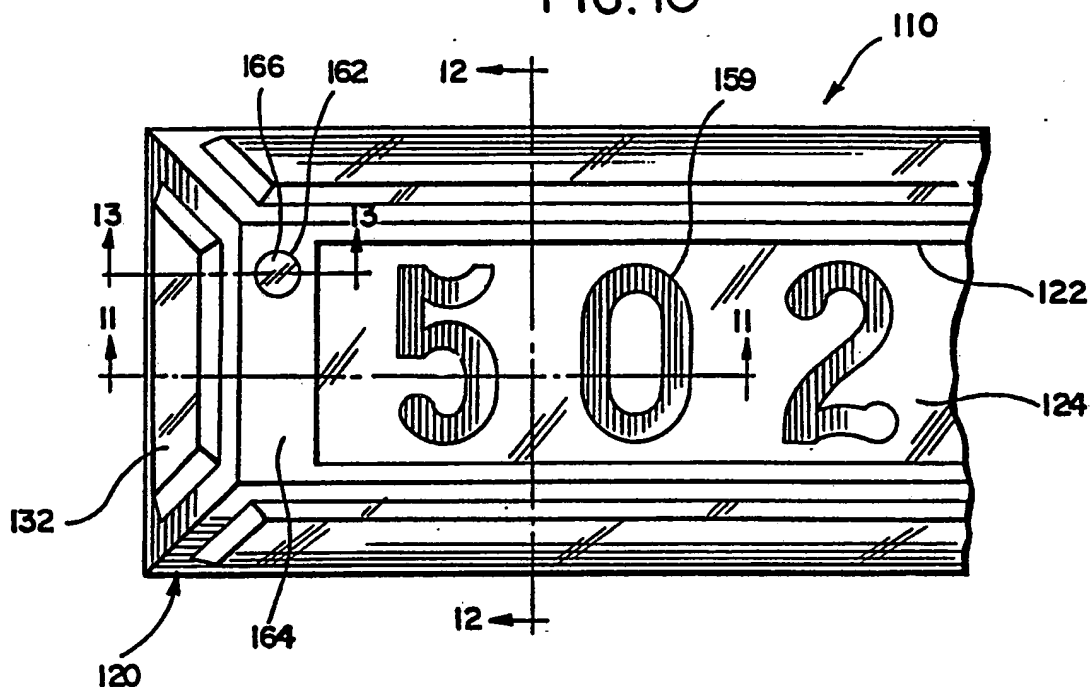


FIG. 13

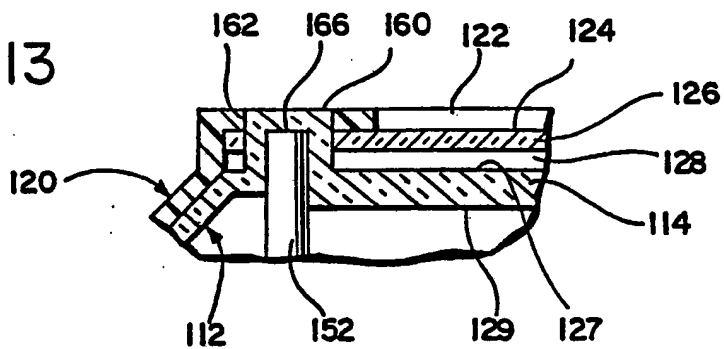
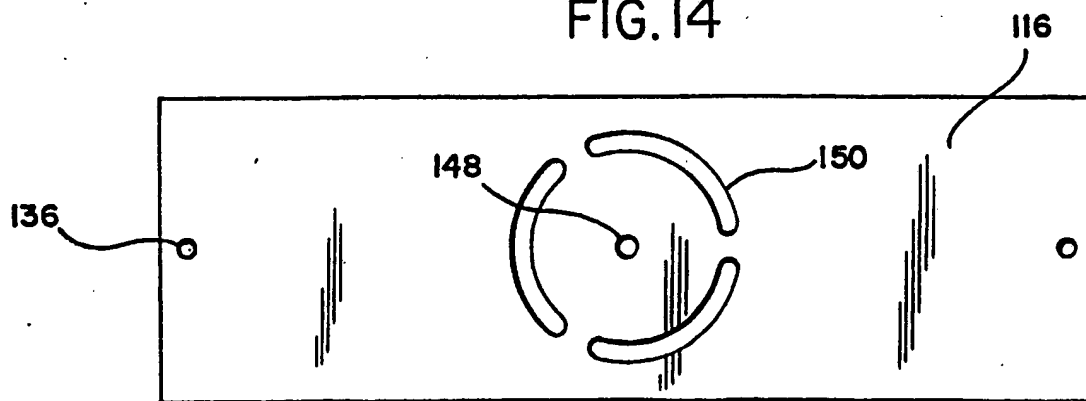


FIG. 14



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FIG. 11

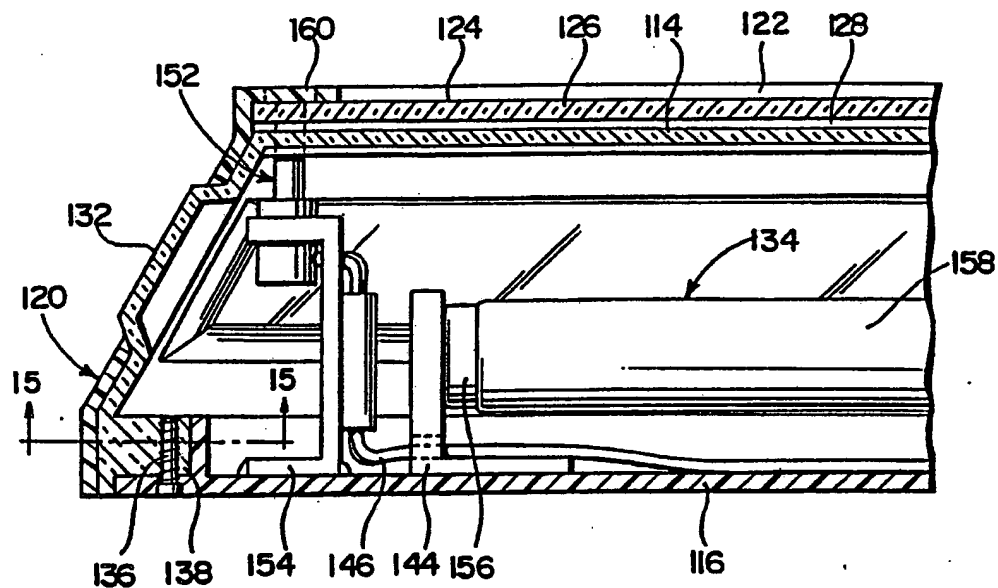


FIG.12

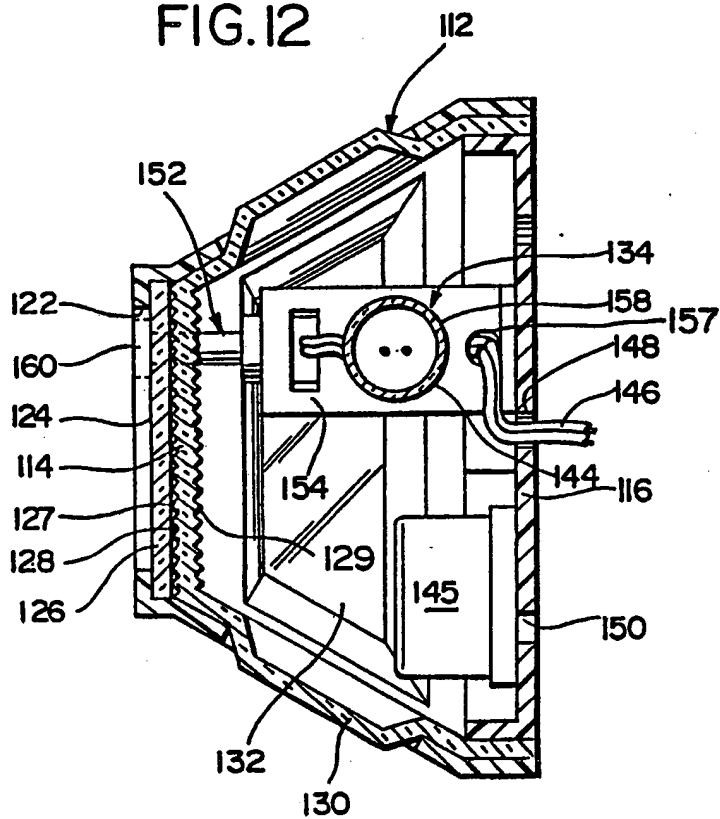
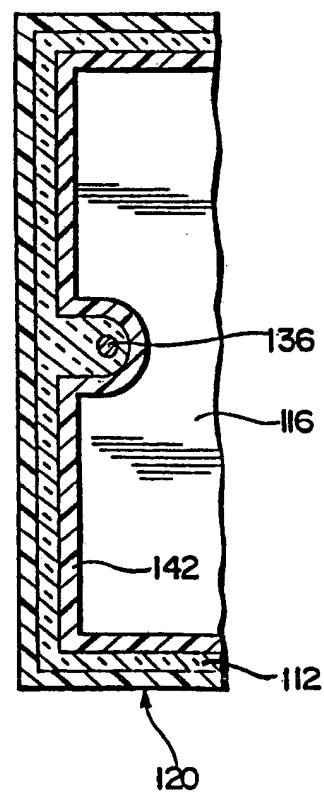


FIG. 15



INTERNATIONAL SEARCH REPORT

International Application No. **PCT/US89/05551**

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC IPC (5) G09 F 13/04 U.S. Cl. 40/576, 564, 553		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
U.S.	40/575,576,564,465,553,579,557,580;315/149;361/173	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y	US,A, 1,826,389 (FULLERTON), 06 OCTOBER 1931. See page 1, line 97 to page 2, line 78.	3,6
Y	US,A, 4,254,457 (LORDIER), 03 MARCH 1981. See column 2, lines 61-68.	3
Y	US,A, 4,035,632 (RAYMAN), 12 JULY 1977. See column 4, lines 57-68.	3,6
Y	US,A, 3,283,138 (HUBER ET AL), 01 NOVEMBER 1966. See column 2, lines 25-28.	3
A	US,733,800 (BEUGLER), 14 JULY 1903. See entire document.	1-6
A	US,A, 1,875,520, (STEINMETZ), 06 SEPTEMBER 1932. See entire document.	1-6
A	US,A, 2,038,409 (BONE), 21 APRIL 1936. See entire document.	1-6
A	US,A, 4,587,753 (HARPER), 13 MAY 1986. See entire document.	1,2,7-12
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
05 February 1990	28 MAR 1990	
International Searching Authority	Signature of Authorized Officer	
ISA/US	Cary E. Stone <i>Cary E. Stone</i>	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

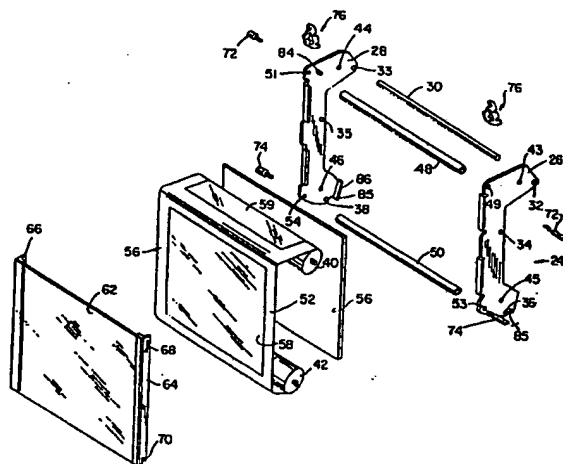
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US,A, 3,015,900 (FRINK ET AL), 09 JANUARY 1962. See entire document.	7-12
A	US,A, 2,651,864 (HOWENSTINE), 15 SEPTEMBER 1953. See entire document.	7-12



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(54) Title: SCROLLING SIGN FOR MENU DISPLAY UNIT



(57) Abstract

A changeable scrolling web sign (10) for selectively displaying a variety of menu items and pricing information in a viewing window (16) includes a scrolling web (52) adapted to receive interchangeable information panels (58, 59). The mounting means (130) for mounting the information panels (58, 59) on the web (52) permits the information panels (58, 59) to move relative to the web (52) in a direction substantially parallel to the scrolling direction of the web (52) for permitting the web (52) and panels (58, 59) to be wound on and paid out from cylindrical take-up rolls (40, 42). A cover (62) is placed over the information panel when positioned in the viewing window of the menu board for maintaining the information panel in a flat, planar viewing position. The sliding movement permitted between the information panel and the web (52) accommodates the varying radii created as the web and information panel are wound on and unwound from the web take-up rolls (40, 42). The scrolling web sign is adapted to the backlighting to enhance the aesthetics of the display. The scrolling web mechanism (24) is adapted to be retrofitted in display units adapted for displaying single sheet panels.

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